REMARKS

Claims 1-28 are now pending in the application. Claims 1, 4, 6, 7, 9, 11, 12, and 13 have been amended, and new claims 15-28 added without introduction of new matter. Favorable reconsideration is respectfully requested in view of the following remarks.

Claims 1-14 stand rejected under 35 U.S.C. §101 as allegedly defining nonstatutory subject matter. In particular, the Office alleges that these claims disclose a process "that manipulates only number, abstract concepts or ideas or representing any of the foregoing...." This rejection is respectfully traversed.

The subject matter variously defined by claims 1-14 is believed to be statutory at least because it is a practical application that produces a useful, concrete, and tangible result. The "real world" value of this subject matter is recited in each of the claims. For example, independent claim 1 defines a method of determining a gain offset between transmission channels in a communication system. Independent claims 4, 6, and 9 variously define methods of determining channel estimates for a transmission channel in a communication system, which methods include first determining a gain offset between the transmission channel and another ("second") transmission channel.

"Gain offset" is known in the art, and defined in the specification at, for example, page 11, lines 24-27 as an amount by which transmission powers of two channels (e.g., the DPCH and the CPICH) differ in a communication system. A utility of the gain offset is also described, for example, at page 11, line 28 through page 12 line 2, as a parameter that enables a receiver to derive an improved channel estimate by combining information about channel estimates derived from the two different channels. More detail about this is further provided in the specification at page 14, line 18 through page 15, line 5, which explains why knowledge of the gain offset enables improved channel estimates to be generated.

The practical utility of "channel estimates" is also well known in the art, and is described in the specification at, for example, page 2, line 22 through page 4, line 14. There it is explained, *inter alia*, that regardless of the channel used, a received signal differs from the transmitted signal in various ways due to the effects of passing through the transmission medium. To recover (or "detect") the information symbols conveyed by the received signal, a receiver typically applies some form of baseband signal processing to the received sample stream. Such baseband signal processing may be based on a model of the transmission medium. The model is often expressed as estimates of filter channel coefficients.

To even further emphasize the "real world" application of the various aspects of Applicants' invention, the preambles of each of the independent claims have been amended to define "A method in a receiver of determining …." Each of the independent claims has been additionally amended to further define "receiving a first signal transmitted through a first channel in the communication system;" and "receiving a second signal transmitted through a second channel in the communication system." These received signals are then utilized in steps that define "deriving a first set of channel estimates from samples derived from the first signal" and "deriving a second set of channel estimates from samples derived from the second signal."

It is clear that the various claims define statutory subject matter at least because:

- The subject matter is "useful": "The USPTO's official interpretation of the utility requirement provides that the utility of an invention has to be (i) specific, (ii) substantial and (iii) credible." M.P.E.P. §2106 IV.C.2.(2)(a) at page 2100-12 (Rev. 5, Aug. 2006). Applicants' claims satisfy this requirement at least because determining a gain offset between two transmission channels in a communications system is a specific, substantial and credible result that enables an improved channel estimate to be determined, which in turn enables information symbols to be recovered (or "detected") from a received signal despite the fact that the received signal was earlier distorted as a result of being transmitted through the channel.
- The subject matter is "tangible": As explained in M.P.E.P. §2106 IV.C.2.(2)(b) at page 2100-12 (Rev. 5, Aug. 2006), "The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result. [citation omitted] … In other words, the opposite meaning of 'tangible' is 'abstract.'" Applicants' claimed subject matter satisfies this test at least because gain offsets represent real world (i.e., tangible) measurable differences between real world transmission gains of real world signals passing through real world transmission channels. Likewise, channel estimates represent real world transmission channels and are used to recover information symbols from real world signals that passed through those transmission

channels. Thus, the invention is applied in a practical way in a real world environment to achieve real world results.

- The subject matter is concrete: The M.P.E.P. §2106 IV.C.2.(2)(c) at page 2100-12 (Rev. 5, Aug. 2006) explains that "Another consideration is whether the invention produces a 'concrete' result. Usually, this question arises when a result cannot be assured. In other words, the process must have a result that can be substantially repeatable or the process must substantially produce the same result again. *In re Swartz*, 232 F.3d 862, 864, 56 USPQ2d 1703, 1704 (Fed. Cir. 2000) (where asserted result produced by the claimed invention is "irreproducible" claim should be rejected under section 101). The opposite of 'concrete' is unrepeatable or unpredictable." The results obtained from Applicants' claimed methods are certainly repeatable and predictable, and therefore satisfy this test.

For at least the foregoing reasons, independent claims 1, 4, 6, and 9 as well as their various dependent claims 2-3, 5, 7-8, and 10-14 are believed to define statutory subject matter. Accordingly, it is respectfully requested that the rejection of claims 1-14 under 35 U.S.C. § 101 be withdrawn.

Claims 1-14 stand rejected under 35 U.S.C. §112, first paragraph. In support of this rejection, the Office states that "Specifically, since the claimed invention is not supported by either an asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention." This rejection is respectfully traversed.

Applicants respectfully disagree with the Office's opinion that the claimed invention is not supported by either an asserted utility or a well established utility. As explained above with respect to the rejection under 35 U.S.C. §101, a use of the gain offset is as a parameter that enables a receiver to derive an improved channel estimate by combining information about channel estimates derived from the two different channels. See, for example, Applicants' specification at page 11, line 28 through page 12 line 2 and at page 14, line 18 through page 15, line 5.

Also as explained above, the practical utility of "channel estimates" is also well known in the art, and is described in the specification at, for example, page 2, line 22 through page 4, line 14. There it is explained, *inter alia*, that regardless of the channel used, a received signal differs from the transmitted signal in various ways due to the effects of passing through the transmission medium. To recover (or "detect") the information symbols

conveyed by the received signal, a receiver typically applies some form of baseband signal processing to the received sample stream. Such baseband signal processing may be based on a model of the transmission medium. The model is often expressed as estimates of filter channel coefficients.

Thus, the practical utility of gain offsets and of channel estimates is both well-known in the art and described in Applicants' specification. Applicants' therefore do not find any basis for the Office's assertion that "the claimed invention is not supported by either an asserted utility or a well established utility." Accordingly, it is respectfully requested that the rejection of claims 1-14 under the first paragraph of 35 U.S.C. § 112 be withdrawn.

Claim 1 stands rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Aschwanden (USPN 5,999,802). This rejection is respectfully traversed.

It is well established that "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See also M.P.E.P. §2131, page 2100-67. In the present instance, the Aschwanden patent fails to anticipate the subject matter defined by claim 1 at least because it fails to disclose or even suggest any of the following claimed features:

- "determining a gain offset between transmission channels in a communication system";
- "deriving a first set of channel estimates" and "deriving a second set of channel estimates";
- "receiving a first signal transmitted through a first channel in the communication system" and then "deriving a first set of channel estimates from samples derived from the first signal"; and "receiving a second signal transmitted through a second channel in the communication system" and then "deriving a second set of channel estimates from samples derived from the second signal";
- "determining the gain offset based on the first and second sets of channel estimates"; and
- "each of the channel estimates [being] a model of a respective one of the first and second channels, and includes one or more channel tap coefficients."

(Emphasis added.)

Each of these points will now be discussed in greater detail:

I. Aschwanden fails to disclose "determining a gain offset *between transmission channels in a communication system*"

The Aschwanden patent deals with correcting In-Phase and Quadrature Phase (I/Q) imbalance that is due to component inaccuracy in a direct conversion tuner. That is, the gain and phase imbalance that is the subject of the Aschwanden patent originates within the receiver itself, not from a transmission channel of a communication system, which is external to the receiver. Thus, the "channels" referred to in the Aschwanden patent are not "transmission channels in a communication system", as required by Applicants' claim, but are instead paths within the Aschwanden tuner. See, e.g., Aschwanden at column 2, lines 59-60: "Basically, the direct conversion tuner contains two channels, each with two conversion stages." By contrast, Applicants' claim 1 expressly defines "A method in a receiver of determining a gain offset between transmission channels in a communication system", and then proceeds to define steps such as "receiving a first signal transmitted through a first channel in the communication system;" and "receiving a second signal transmitted through a second channel in the communication system". The claimed gain offset is then derived from these signals which have been received from the first and second transmission channels in the communication system.

II. Aschwanden fails to disclose "deriving a first set of *channel estimates*" and "deriving a second set of *channel estimates*"

The Office supports its rejection by alleging that Aschwanden's component "GC" (see figure 5) generates a first set of channel estimates, and that the component "PC" (see figure 5) generates a second set of channel estimates. These allegations are without technical merit because Aschwanden very clearly describes that the component GC is a gain control unit, and that the component PC is a phase correction unit. (See Aschwanden at column 6, lines 15-19.) Neither of these components generates first or second channel estimates, each of which is defined in Applicants' claim 1 as "a model of a respective one of the first and second channels, and includes one or more channel tap coefficients". Rather, "[g]ain correction unit GC and phase correction unit PC comprise respective programmable digital filters which are controlled by a microcomputer MC to adjust the gain and phase characteristics of channel A so that the gain of [sic: and?] phase characteristics of the channels A and B are substantially identical." (Aschwanden at column 6, lines 21-26.)

III. Aschwanden fails to disclose "receiving a first signal *transmitted through a first channel* in the communication system" and then "deriving a first set of channel estimates from samples derived from the first signal"; and "receiving a second signal *transmitted through a second channel* in the communication system" and then "deriving a second set of channel estimates from samples derived from the second signal"

This aspect of Applicants' claim 1 clearly defines deriving a first set of channel estimates corresponding to a first channel, and deriving a second set of channel estimates corresponding to a second channel. As mentioned above, the Office alleges that Aschwanden's component "GC" (see figure 5) generates a first set of channel estimates, and that the component "PC" (see figure 5) generates a second set of channel estimates.

It was explained above why the components GC and PC cannot be considered channel estimators. Nonetheless, even if they were channel estimators, their arrangement in Aschwanden would still fail to satisfy this aspect of Applicants' claim because both of the filters GC and PC are applied only to "channel A" (see, e.g., Aschwanden's figure 5, and column 6, lines 19-21: "The gain and phase correction network is inserted in channel A between LPF A and output summer SU2"). Being arranged in only one "channel" prevents these components from being able to generate first and second channel estimates corresponding to respective first and second channels.

IV. Aschwanden fails to disclose "determining the gain offset based on the first and second sets of channel estimates"

In support of its rejection, the Office alleges that this aspect of Applicants' claimed invention is disclosed in Aschwanden at column 4, lines 17-19. Applicants respectfully disagree for at least the following reasons.

To begin with, the cited portion of Aschwanden merely states that "[i]n practice, gain and phase characteristics of the two channels are unequal and change with temperature and time." That is, this portion of Aschwanden states that an offset exists, but doesn't explain how to determine it. As to the latter, Aschwanden discloses a microprocessor (MC) that generates this offset and the relevant signals for controlling the filters GC and PC. As described by Aschwanden at column 6, lines 28-41:

> Microcomputer MC samples the signals developed at points A and B just before second mixers M2A and M2B in response to a test signal and determines the relative amplitudes and phases of the sampled signals to develop filter coefficient control signals for gain correction unit GC and phase correction unit PC. For this purpose, microcomputer MC generates a reference signal labeled ω_{REF} which is inserted as a test signal just after first mixers M1A and M1B, for example, via resistors RA and RB. Microcomputer MC also samples the signals developed at points A and B in response to the received RF signal for the selected channel and determines the relative amplitudes and phases of the sampled signals the to develop the filter coefficient control signals.

Thus, according to Aschwanden, the microprocessor MC determines the gain and phase offsets between the two tuner paths by generating a test signal that is injected into the circuits, and then sampling the signals at points A and B to determine the relative amplitude and phase differences. This is quite different from Applicants' claimed technique, which includes "determining the gain offset based on the first and second set of *channel estimates*". As explained earlier, Aschwanden does not disclose generating any channel estimates, and therefore cannot disclose determining a gain offset based on channel estimates.

V. Aschwanden fails to disclose "each of the channel estimates [being] a model of a respective one of the first and second channels, and includes one or more channel tap coefficients."

The Office's rejection relies on Aschwanden's components GC and PC being respective first and second sets of channel estimates. However, Applicants' claims expressly define what channel estimates are when they recite "wherein each of the channel estimates is a model of a respective one of the first and second channels, and includes one or more channel tap coefficients." In view of this recitation and Aschwanden's silence with respect to channel estimation, it is respectfully asserted that there is no reasonable justification for alleging that the function of Aschwanden's equalization filters GC and PC is to generate channel estimates.

For at least the foregoing reasons, independent claim 1 is believed to define subject matter that is patentably distinguishable over the Aschwanden patent. Accordingly, it is respectfully requested that the rejection of claim 1 under 35 U.S.C. §102(b) be withdrawn.

Claims 2 and 3 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Aschwanden in view of Choi (USPN 6754473). This rejection is respectfully traversed in the following.

Claims 2 and 3 depend from independent claim 1. Because these dependent claims inherit the features of their base claim (claim 1) they are patentably distinguishable over the Aschwanden patent for at least the same reasons as those set forth above.

The Choi patent fails to make up for the deficiencies of Aschwanden, so that any combination of the two patents would still fail to include all of the features defined by Applicants' claims. The Office variously relies on Choi for its disclosures of pilot channels and of the WCDMA channels referred to in the art as DPCH and CPICH. However, Choi fails to disclose or suggest features such as deriving a first set of channel estimates from samples derived from a first signal (which is received after having been transmitted through a first channel); deriving a second set of channel estimates from samples derived from a second signal (which is received after having been transmitted through a second channel); and determining the gain offset based on the first and second sets of channel estimates, as required by Applicants' claims. Consequently, any combination of Aschwanden with Choi will still fail to include these features.

Further, to clarify the record, it is observed that in numbered paragraph 14 of the Office Action, it is stated that "Choi suggests the beneficial use of channels being DPCH and CPICH (such as using the DPCH as a paging channel (as DPCH stands for data paging channel) in order to page an end unit ...." (Emphasis added.) This is factually incorrect, at least with respect to Applicants' claims, because claim 3 expressly discloses that "DPCH" (which is a well-known term in the context of WCDMA communication systems) stands for "Dedicated Physical Channel."

For at least the foregoing reasons, claims 2 and 3 are believed to be patentably distinguishable over the Aschwanden and Choi patents, regardless of whether these documents are considered individually or in any combination. Accordingly, it is respectfully requested that the rejections of these claims under 35 USC §103(a) be withdrawn.

New claims 15-28 have been added without introduction of new matter. These claims define apparatus embodiments of the invention that correspond to the existing method claims.

These claims are believed to be patentable over the prior art of record at least for the same reasons set forth above with respect to claims 1-14.

The application is believed to be in condition for allowance. Prompt notice of same is respectfully requested.

Respectfully submitted,

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Date: May 14, 2007

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